Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of Partitioning, Disaggregation, and Leasing of Spectrum	WT Docket No. 19-38

COMMENTS OF GOOGLE LLC

Megan Anne Stull
Counsel

Andrew W. Clegg, PhD
Spectrum Engineering Lead

Google LLC
25 Massachusetts Avenue NW, 9th Floor
Washington, DC 20001

June 3, 2019

Table of Contents

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of Partitioning, Disaggregation, and Leasing of Spectrum	WT Docket No. 19-38

COMMENTS OF GOOGLE LLC

Google concurs with the Commission's long-held view that private sector markets for spectrum "serve the public interest by creating new opportunities for increasing the communications capacity and efficiency of spectrum use by licensees."[1] While not a substitute for identifying new licensed and unlicensed spectrum for commercial use, a "robust and effective" secondary market could alleviate local spectrum shortages and "help to promote the development of new, spectrum efficient technologies."[2]

Despite the Commission's past efforts, today's policies have fallen short in making unused spectrum held by large mobile operators available to users with geographically-limited or novel business models.[3] In particular, transaction costs and inadequate incentives to engage in secondary use arrangements have impeded

[1] *See Principles for Promoting the Efficient Use of Spectrum by Encouraging the Development of Secondary Markets*, Policy Statement, 15 FCC Rcd. 24178, ¶ 2 (2000) (*2000 Policy Statement*).
[2] *Id.*
[3] *See In the Matter of Partitioning, Disaggregation, and Leasing of Spectrum*, Notice of Proposed Rulemaking, WT Docket No. 19-38 (rel. Mar. 15, 2019) (*NPRM*).

secondary markets. There are potential fixes. Database systems and other modern spectrum management tools can be used to enable quick, low-cost, automated transactions, thereby reducing transaction costs and speeding the transfer of spectrum assets. The Commission additionally can encourage greater participation in secondary markets by both potential spectrum lessors and potential lessees through policies such as permitting reaggregation, extending performance deadlines, and promoting opportunity zone programs. If lower transaction costs and enhanced incentives fail to spur the performance of secondary markets, however, stronger action in the form of "use of share" requirements for spectrum licensees would be warranted to align the obligations of spectrum holders with the interests of consumers.

I. Secondary Markets for Spectrum Have Not Reached Their Potential.

While the Commission rightly has relied on spectrum auctions and unlicensed spectrum designations to create new wireless access opportunities, it also has sensibly sought to enable secondary markets as a means of putting otherwise-unutilized spectrum into use. As Marcela Gomez, Martin Weiss, and Prashant Krishnamurthy observe, secondary markets hold promise "as a means to correct possible inefficiencies resulting from the primary market and an alternative for carriers to respond to changing technologies and market conditions."[4] Secondary markets could "help alleviate spectrum scarcity by making underutilized spectrum held by current licensees readily available to new uses and users, hence promoting the development of novel and more

[4] Marcela Gomez *et al.*, *Improving Liquidity in Secondary Spectrum Markets: Virtualizing Spectrum for Fungibility*, Feb. 26, 2019, at 2, *available at* http://d-scholarship.pitt.edu/36013/1/TCCN%20Gomez%202019.pdf (*Gomez Paper*).

spectrum efficient technologies."[5] As John Mayo and Scott Wallsten observe, an effective, well-functioning secondary market could "help ensure that, as demand and supply shift, spectrum will migrate to more efficient uses, including those by parties outside of the initial allocation."[6]

Despite the Commission's efforts, however, secondary market transactions have had only limited impact on small and innovative spectrum users. The secondary market has been relatively helpful in allowing established carriers to expand or consolidate their spectrum holdings.[7] For instance, a 2013 study of the Commission's Universal Licensing System database conducted by Mobile Future found that 89% of MHz/POPs assigned or transferred on the secondary market went *to* major wireless providers or between non-nationwide providers.[8] But shuffling spectrum resources between carriers does not alone maximize the availability and beneficial use of spectrum. In particular, the secondary market has been less than effective in making underutilized spectrum available for new innovations and use cases.

---

[5] *Id.* at 2.
[6] John W. Mayo *et al*., *Enabling Efficient Wireless Communications: The Role of Secondary Spectrum Markets*, June 2009, at 2, *available at* https://cbpp.georgetown.edu/sites/default/files/Mayo-Wallsten-Enabling-Wireless-Communications-Secondary-Spectrum-Markets.pdf.
[7] *See, e.g.,* Harold Feld *et al*., *Breaking the Logjam: Creating Sustainable Spectrum Access Through Federal Secondary Markets*, 2009, n.29, *available at* https://www.publicknowledge.org/pdf/pk-spectrum-fed-secondary-markets-whitepaper.pdf (noting that the "vast majority of secondary market transactions are de facto lease transfers of spectrum licenses").
[8] Mobile Future, *FCC Spectrum Auctions and Secondary Markets Policies: An Assessment of the Distribution of Spectrum Resources Under the Spectrum Screen*, Nov. 2013, at 19 (attached to Letter from Jonathan Spalter, Mobile Future, to Marlene H. Dortch, Secretary, FCC, in GN Docket No. 12-268 (Nov. 13, 2013), *available at* https://ecfsapi.fcc.gov/file/7520957584.pdf) (*Mobile Future Paper*).

Carriers often hold surplus spectrum due to the Commission's preference for large geographic license areas with long license terms in licensing available spectrum, in order to reduce transaction costs for large operators and the Commission itself.[9] Recently, in adopting policies favoring large license areas, the Commission specifically anticipated that private, secondary market transactions would overcome the inefficiencies resulting from aggregating spectrum into larger units for auction.[10] However, historically, that has not occurred. Auction winners have not placed surplus spectrum on the secondary market at all, or at least not on terms desirable to potential buyers.

The rarity of secondary market transactions that benefit smaller operators can be seen in the Commission's records. Mobile Future found that in the ten-year period from January 1, 2003 to May 31, 2013, out of a total of 5,081 applications granted by the Commission for assignment, transfer, or lease of mobile broadband spectrum, only 32.42% of MHz/POPs assigned or transferred, and only 24.29% of MHz/POPs leased,

[9] For instance, in its recent rulemaking on the 3.5 GHz CBRS band, the Commission increased the size of Priority Access License areas from census tracts to counties, and extended the license term from three to ten years with the possibility of renewal. *See In the Matter of Promoting Investment in the 3550–3700 MHz Band*, Report & Order, 33 FCC Rcd. 10598, ¶ 7 (2018) (*CBRS Order*). *See also In the Matter of Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions,* Report and Order, 29 FCC Rcd. 6567, ¶¶ 18, 37 (2014); *In the Matter of Use of Spectrum Bands Above 24 GHz For Mobile Radio Services et al.,* Report and Order and Further Notice of Proposed Rulemaking, 31 FCC Rcd. 8014, ¶¶ 17, 82, 121 (2016); *In the Matter of Expanding Flexible Use of the 3.7 to 4.2 GHz Band et al.*, Order and Notice of Proposed Rulemaking, 33 FCC Rcd. 6915, ¶ 149 (2018) (*C-Band Order*).

[10] *See, e.g., CBRS Order* ¶ 97 (asserting that where the Commission has "decided to license the 3.5 GHz band in larger geographic areas for longer, renewable license terms . . . secondary market transactions will allow licensees and the marketplace to determine the correct size of licenses on a market-specific and needs-based basis").

went to non-nationwide operators.[11] Things have not improved in the six years since: across all 4,113 licenses awarded between 2014 and 2017 through the H-Block, AWS-3, and Broadband Incentive Auctions, only 11 leases have been recorded with the Commission.

Consistent with Commission data, a survey of members conducted by the Wireless Internet Service Providers Association (WISPA) in 2017 found that 90% of its wireless broadband provider members who attempted to acquire spectrum from carriers on the secondary market were unable to do so.[12] According to WISPA members, carriers either were unwilling to negotiate or imposed unacceptable conditions on potential transactions, scuttling proposed deals.[13] A 2014 study by NERA Economic Consulting similarly noted that the historical record of the "larger carriers leasing, disaggregating or partitioning large sections of spectrum where they already have service" was thin.[14] Because small area licenses have a low value as compared to the rest of their spectrum portfolio, NERA posited that "larger operators may give very low priority to disaggregating" those licenses.[15] As MetaLINK Technologies, a wireless broadband provider, explained in comments to the Commission in 2017, "there is little

[11] *Mobile Future Paper* at 19.
[12] Comments of the Wireless Internet Service Providers Ass'n in GN Docket No. 17-258 at A-3 (filed Dec. 28, 2017), *available at* https://ecfsapi.fcc.gov/file/12280810623028/CBRS_Comments_on_NPRM.pdf.
[13] *Id.* at 43-44.
[14] NERA Economic Consulting, *Local and Regional Licensing for the US 600 MHz Band (Incentive Auction)*, Jan. 2014, at 18-19, *available at* http://www.nera.com/content/dam/nera/publications/archive2/PUB_NCTA_0114.pdf.
[15] *Id.*

interest to lease [spectrum] unless the secondary market bidder is willing to pay an exorbitant amount."[16]

Improving secondary market performance has been a consistent Commission goal. As far back as 2000, the Commission planned to "significantly expand and enhance the existing secondary markets for spectrum usage rights to permit spectrum to flow more freely among users and uses in response to economic demand."[17] That year, the Commission issued a policy statement and rulemaking to promote spectrum availability and efficient spectrum usage through development of secondary markets, and discussed the need to promote market processes through the establishment of private spectrum exchanges and brokers.[18] In 2003, the Commission permitted licensees to lease spectrum so long as service obligations were met.[19] The following year, the Commission provided for immediate processing of certain leasing and license assignment and transfer transactions.[20] Five years later, in the *National Broadband Plan*, the Commission reiterated its goal to "evaluate the effectiveness of its secondary

---

[16] Comments of MetaLINK Technologies in GN Docket No. 17-258 at 2 (filed Dec. 26, 2017), *available at* https://ecfsapi.fcc.gov/file/122303895003/MetaLINK_17-258_Comments.pdf.
[17] *2000 Policy Statement* ¶ 1.
[18] *See id.*; *In the Matter of Promoting Efficient Use of Spectrum Through Elimination of Barriers to the Development of Secondary Markets*, Notice of Proposed Rulemaking, 15 FCC Rcd. 24203 (2000).
[19] *In the Matter of Promoting Efficient Use of Spectrum Through Elimination of Barriers to the Development of Secondary Markets*, Report and Order and Further Notice of Proposed Rulemaking, 18 FCC Rcd. 20604, ¶ 12-13 (2003).
[20] *In the Matter of Promoting Efficient Use of Spectrum Through Elimination of Barriers to the Development of Secondary Markets*, Second Report and Order, Order on Reconsideration, and Second Further Notice of Proposed Rulemaking, 19 FCC Rcd. 17503, ¶¶ 47-50 (2004).

markets policies and rules to promote access to unused and underutilized spectrum."[21] This led to the launch in March 2010 of the now-inactive Spectrum Dashboard, which was intended to "improve the transparency of spectrum allocation, support spectrum policy planning, and promote a secondary market in spectrum."[22]

Consistent with the Congressional direction in the MOBILE NOW Act,[23] the Commission should continue its efforts to stimulate secondary markets due to their potentially critical role in maintaining efficient spectrum and wireless markets. Leveraging secondary markets to put underutilized or unused spectrum resources to work for the American people should remain a paramount goal.

II. High Transaction Costs Hamper the Development and Use of Secondary Spectrum Markets.

Ensuring access to unused or underutilized licensed spectrum frequencies through secondary markets is crucial to maximizing the benefits of spectrum over time. However, "[e]ven when licenses are flexible enough for secondary markets to work, bureaucratic barriers can make matching willing buyers and sellers difficult."[24]

---

[21] FCC, *Connecting America: The National Broadband Plan*, Mar. 16, 2010, at 75, *available at* https://transition.fcc.gov/national-broadband-plan/national-broadband-plan.pdf.
[22] *See* FCC, *Broadband Action Agenda*, Apr. 8, 2010, at 3, *available at* https://transition.fcc.gov/national-broadband-plan/national-broadband-plan-action-agenda.pdf; FCC, *Spectrum Dashboard*, *at* http://reboot.fcc.gov/reform/systems/spectrum-dashboard (last visited June 3, 2019) (noting that the "Spectrum Dashboard was last updated on July 7, 2014 except for full power TV station data which is based on the June 2009 transition to digital television").
[23] MOBILE NOW Act, Pub. L. No. 115-141, Division P, Title VI, § 616 (2018).
[24] Joe Kane, *How To Reduce Transaction Costs In Spectrum Markets*, R Street Policy Study No. 166, at 5 (Mar. 2019), *available at* https://2o9ub0417chl2lg6m43em6psi2i-wpengine.netdna-ssl.com/wp-content/uploads/2019/03/Final-166-Updated1.pdf (*Kane Paper*).

Potentially larger acquirers of spectrum, like Comcast, are among those noting "high transaction costs [in secondary markets] that often limit the potential for partitioning and disaggregation to result in an ideal allocation of spectrum rights."[25] Lowering transaction costs for market participants therefore could prove effective in catalyzing secondary markets.

Transaction costs in secondary spectrum markets take several forms. Simply finding what spectrum resources are available is often a challenge for potential buyers. As OECD noted, availability of information, "by frequency and geographical locations, is important for prospective buyers of spectrum. The lack of a publicly searchable register of management rights and licenses has been highlighted as a potential reason for lack of secondary trading."[26] The Commission should consider creation or support of tools to lower the time and opportunity costs of locating frequencies. For instance, the Commission could consider reviving its Spectrum Dashboard, which has not been

---

[25] Comments of Comcast Corp. in GN Docket No. 17-258 at 13 (filed Dec. 28, 2017), *available at* https://ecfsapi.fcc.gov/file/1228142944789/2017-12-28%20AS-FILED%20Comcast%203.5%20GHz%20NPRM%20Comments.pdf.

[26] OECD, *Secondary Markets For Spectrum: Policy Issues*, OECD Digital Economy Papers No. 95, at 24 (Apr. 20, 2005), *available at* https://www.oecd-ilibrary.org/docserver/232354100386.pdf?expires=1559155889&id=id&accname=guest&checksum=D172255BD4E7F72272E6B216BF85576F (*OECD Paper*). *See also* Gov't Accountability Office, *Tribal Broadband: FCC Should Undertake Efforts to Better Promote Tribal Access to Spectrum,* Nov. 2018, *available at* https://www.gao.gov/assets/700/695635.pdf (case study explaining that the Commission "does not make information on spectrum-license holders available in an easy or accessible manner," including information on how to contact license holders. GAO was unable to find information on license holders in specific tribal areas because "the system is so difficult to use").

updated for the past five years, and adding to it higher-frequency spectrum above 3700 MHz.[27]

In addition to the significant transaction costs "in the form of the time, energy and money" required to identify available frequencies, market participants face costs from paperwork, including reaching agreeable terms, reshuffling spectrum rights so that the exchanged resources can be used,[28] and administrative filings. Even in a secondary market, working out the details of a contract for spectrum rights can be cumbersome and may "involve extensive, complex negotiations."[29]

As transaction costs accumulate, the "number of exchanges that can be profitably carried out within spectrum markets" decreases.[30] The unfortunate result is spectrum locked into unproductive configurations, to the detriment of all parties, particularly potential users in rural areas.[31] As Microsoft has observed, it is not surprising that some secondary market mechanisms "have largely failed in the real world, because the transaction costs to acquire access to spectrum in small geographic

---

[27] *See* FCC, *Spectrum Dashboard*: *Browse Spectrum Bands*, http://reboot.fcc.gov/spectrumdashboard/searchSpectrum.seam (last visited June 2, 2019) (allowing users to browse spectrum bands from 225 MHz–3700 MHz).
[28] *See Kane Paper* at 2. *See also* OFCOM, *Simplifying Spectrum Sharing: Spectrum Leasing and Other Market Enhancements*, Final Statement, at 7.4 (2011), *available at* https://www.ofcom.org.uk/__data/assets/pdf_file/0030/62778/statement-spectrum-leasing.pdf (U.K.) (*OFCOM Consultation*) (estimating that the "cost of legal and contract advice on radio spectrum can easily amount to £1000 a day, which can overwhelm financial benefits from trade of small assignments or for short periods").
[29] *See Kane Paper* at 5; Comments of the General Electric Co. in GN Docket No. 17-258 at 24 (filed Dec. 28, 2017), *available at* https://ecfsapi.fcc.gov/file/1228908225907/GE%20Comments%20on%20CBRS%20NPRM%20filed%20122817.pdf.
[30] *Kane Paper* at 5.
[31] *Id*.

areas in less densely populated areas are higher than the value of the spectrum to be leased or sold."[32]

III. Spectrum Exchanges Can Use Automated Systems Developed for Shared Bands to Lower Transaction Costs and Speed Transfers in Secondary Markets.

Spectrum exchanges already provide a marketplace through which buyers can identify and lease unused bandwidth.[33] With the Commission's support, spectrum exchanges also could support automated regulatory approval of secondary market transactions. In particular, spectrum exchanges could leverage database systems and other tools developed by Google and other companies for the Citizens Broadband Radio Service (CBRS) and other shared spectrum bands. Encouraging this use of database technologies would be a logical extension of other recent Commission actions to enhance fluidity in spectrum availability and to administer interference management quickly, efficiently, and reliably. It would also promote the spectrum priorities recently identified by the White House Office of Science and Technology Policy and National Science and Technology Council to address near- and long-term spectrum research

---

[32] Comments of Microsoft Corp. in GN Docket No. 17-258 at 7 (filed Dec. 28, 2017), *available at* https://ecfsapi.fcc.gov/file/122856164145/CBRS%20NPRM%20--%20Microsoft%20Comments%20--%20FINAL%20--%2012.28.17.pdf.

[33] *See, e.g.,* Rivada Networks, https://www.rivada.com/ (last visited May 29, 2019). Circa 2003, the Commission's secondary market rules led to the creation of earlier stage public-facing markets, such as SpectrumBridge's SpecEx.com and Cantor Fitzgerald's Cantor Spectrum Exchange. *See* Yochai Benkler, *Open Wireless vs. Licensed Spectrum: Evidence from Market Adoption*, Harvard Journal of Law and Technology, at 14 (2012), *available at* http://www.benkler.org/Open_Wireless_V_Licensed_Spectrum_Market_Adoption_current.pdf.

and development challenges: increased spectrum flexibility, near real-time spectrum awareness, and improved spectrum efficiency through secure, automated usage decisions.[34]

The CBRS band illustrates the role that automated admissions databases could play to enable an effective and robust secondary market for commercial spectrum.[35] All Citizens Broadband Radio Service Devices (CBSDs) seeking to use 3.5 GHz spectrum must register with and be authorized by a Spectrum Access System (SAS) before they are permitted to transmit in the band.[36] CBSD registration data must include detailed information specifying the CBSD's location and characteristics,[37] which SAS Administrators may not disclose to the public absent authorization by the registrant. Using this data, the SAS acts to promote spectral efficiency and non-discriminatory coexistence, while reducing interference among General Authorized Access users. Upon a change in registration information, the CBSD must transmit an update to the

---

[34] The White House Office of Science and Technology Policy, *Research and Development Priorities for American Leadership in Wireless Communications*, May 2019, *available at* https://www.whitehouse.gov/wp-content/uploads/2019/05/Research-and-Development-Priorities-for-American-Leadership-in-Wireless-Communications-Report-May-2019.pdf.

[35] *CBRS Order* ¶ 101 (in which the Commission recognizes that the SAS can be leveraged to facilitate secondary market transactions).

[36] 47 C.F.R. § 96.39(c).

[37] Specifically, a CBSD must provide the SAS with geographic location, antenna height above ground level in meters, CBSD class, requested authorization status, FCC identification number, call sign, user contact information, air interface technology, unique manufacturer's serial number, any supported sensing capabilities, and additional information on its deployment profile required by Sections 96.43 and 96.45 of the Commission's rules. *Id.* § 96.39(c). Section 96.43 requires Category A CBSDs to indicate whether the device will be operated indoors or outdoors. *Id.* § 96.43(b). Section 96.45 requires Category B CBSDs to include antenna gain, beamwidth, azimuth, downtilt angle, and antenna height above ground level. *Id.* § 96.45(d).

SAS within 60 seconds.[38]

It is easy to conceive of a modernized spectrum exchange that takes advantage of today's database capabilities. Spectrum exchanges powered by databases could draw on actual usage information submitted by licensees and lessees in accordance with Commission rules,[39] and be algorithmically programmed to recognize priority spectrum rights and/or sharing rules, as well as possible complementary uses. Furthermore, licensees interested in placing additional spectrum in the secondary market could provide the exchange administrator with information for inclusion in the database, such as protection/availability criteria or conditions like a term of years or other reversion criteria under which the licensee could retake the spectrum. Entities interested in finding spectrum on the secondary market would query the exchange to find a "match." Using information from the database, the exchange would present viable frequencies. So long as the potential spectrum use does not cause impermissible interference or otherwise violate governing rules, the exchange would administer the transaction. Conversely, if an approved transaction were later found to create harmful interference or another compliance issue, the exchange would automatically shut down

[38] *Id*. § 96.39(c).

[39] To ensure seamless transactions, the Commission should ensure that its databases do not contain "information regarding current use [that] . . . is inaccurate and/or incomplete." *See C-Band Order* ¶ 16. As it has for the 3.7–4.2 GHz band, the Commission should collect additional information about how spectrum if being used, as well as "how incumbent operators could be protected, accommodated, or relocated, and the overall structure of the band going forward." *Id.*

the spectrum use, similar to what the Commission presently is considering for the 6 GHz band.[40]

Importantly, the detail and accuracy of information available in geodatabases, including the locations, shapes, and material nature of buildings and foliage, is rapidly increasing. Such information is enabling a new generation of accurate propagation prediction models, which can use the data in combination with advanced ray tracing and diffraction computations to better understand how signals propagate. Leveraging these capabilities, automated systems can provide detailed predictions of the availability of spectrum resources on a much finer scale and with better reliability than ever before.

With an updated Form 603 process, basic transaction information could flow between the transaction database to the Commission. Transactions within Commission-defined parameters would be deemed approved upon submission. Additionally, the Commission should consider following regulatory counterparts abroad and deregulating some lease transactions entirely. For example:

- In the United Kingdom, regulatory approval of spectrum leases is not necessary so long as the leases are carried out in compliance with the license terms. Lessors remain ultimately responsible for fulfilling license obligations.[41]

[40] *See, e.g.,* Comments of Motorola Solutions in ET Docket Nos. 18-295 and GN Docket No. 17-183, at 2 (filed Feb. 15, 2019), *available at* https://ecfsapi.fcc.gov/file/10215714009821/MSI%206%20GHz%20NPRM%20Comments.Final.pdf; Comments of CTIA in ET Docket No. 18-295 and GN Docket No. 17-183, at 19 (filed Feb. 15, 2019), *available at* https://ecfsapi.fcc.gov/file/10215711624047/190215%20FINAL%20CTIA%20Comments%20on%206%20GHz%20NPRM.pdf.

[41] *OFCOM Consultation* at 22-23.

- In Sweden, short-term spectrum leases of up to six months within a 12-month period, or leases covering no more than ten transmitters, are exempt from obligations to seek regulatory approval.[42]

Beyond their use in the acquisition of frequencies on spectrum exchanges, dynamic spectrum databases could be leveraged for additional uses in support of healthy secondary markets. For instance, as seen in stock markets and e-commerce, databases could enable automated transactions to support large spectrum orders, making markets simpler and less expensive for small businesses and innovators. This would allow entities to carve out more specialized roles in the wireless telecommunications marketplace, reduce the need for vertical integration to provide end-to-end services, and support innovative business models. In particular, database mechanisms enabling microtransactions for spectrum as well as other necessary inputs could allow entities to focus on what they do best, such as building new facilities, providing high-quality services, and/or subscriber acquisition and management.

IV. Additional Incentives Could Stimulate Secondary Spectrum Markets.

Successful secondary markets rely on the presence of adequate incentives to motivate participation both by holders of unused spectrum and potential users of that spectrum. Some of the suggestions in the *NPRM*, including reaggregation and extended performance deadlines, could enhance the fluidity of spectrum holdings and thus make secondary transactions more attractive for all parties. In addition, opportunity zone

[42] PTS, Överlåtelse och Uthyrning [Transfer and Rental], *at* https://www.pts.se/sv/Bransch/Radio/Radiotillstand/Overlatelse-och-uthyrning/ (last visited June 3, 2019) (Swed.).

programs could generate greater interest in specific geographical markets by potential secondary users.

Reaggregation. The Commission should allow reaggregation of spectrum partitioned or disaggregated on the secondary market, up to the size of the original market area. Current Commission rules do not provide a means to reaggregate spectrum, even when previously partitioned or disaggregated portions of an original license area are acquired by a single entity.[43] Holding and maintaining multiple licenses for what was formerly a single license increases costs for licensees, "including construction requirements, renewal showings, continuous service requirements, and the need to maintain up-to-date information in ULS."[44] This discourages disaggregation in the first place. As Sprint Nextel noted in 2010, "Allowing consolidation of previously partitioned and/or disaggregated licenses will simplify the administration, tracking and use of geographic area licensing information for licensees, the Commission staff and the public."[45]

To the extent that possible manipulation of disaggregation and reaggregation to evade regulatory construction deadlines is a concern, the Commission could condition reaggregation on building out the entire reaggregated service area. And while reconstituting larger license areas may cause the Commission to incur costs in processing applications, those one-time agency costs should be lower than the ongoing

[43] *NPRM* ¶ 28.
[44] *Id.*
[45] Comments of Sprint Nextel Corporation in WT Docket No. 10-112 at 19-20 (filed Aug. 6, 2010), *available at* https://ecfsapi.fcc.gov/file/7020661763.pdf.

costs of administering multiple licenses, and can be recovered by assessing cost-based application fees for reaggregation.[46]

Performance Requirements. Particularly in rural areas, the *NPRM*'s suggestion that "reduced performance requirements for partitioned or disaggregated licenses would facilitate the deployment of advanced telecommunications services"[47] is not necessarily true. Rather, as the Commission itself recognized in its *CBRS Order*, performance requirements can encourage licensees "to make timely and productive use of their licenses, and to the extent they choose not to do so, will incentivize them to make . . . spectrum available to others through secondary market transactions."[48]

Nevertheless, some flexibility in meeting build-out requirements could encourage secondary market activity by better positioning secondary users to help licensees meet the terms of their authorizations. For instance, the Commission could adjust performance deadlines based on the length of secondary usage, with reasonable time limits and mandatory attestations confirming the arms-length nature of the secondary transaction, to avoid "gaming" of buildout obligations.

Opportunity Zones to Generate Demand. The opportunity zone concept could be leveraged to target specific geographic areas for wireless development, including through secondary spectrum transactions.[49] Financial incentives, such as reduced

[46] *NPRM* ¶ 30.
[47] *Id.* ¶ 15.
[48] *CBRS Order* ¶ 62.
[49] *See, e.g.*, Gigabit Opportunity Act, S.1013, 115th Cong. (2017) (authorizing designation of "gigabit opportunity zones" in low-income areas and tax incentives—such as capital gains exemptions, tax-exempt bonds, and immediate expensing of property costs—for entities that invest in high-speed broadband facilities).

regulatory fees or extended buildout timeframes, could be awarded to licensees who free spectrum for use in the opportunity zone. To the extent additional statutory authority is required to implement beneficial concepts, the Commission may wish to work with the Administration and Congress on appropriate legislation.

* * * * *

Ideas like the proposals discussed above would best be developed by the Commission in consultation with major spectrum licensees, potential secondary users, and providers of relevant technologies such as spectrum management databases. To that end, the Commission may wish to convene a workshop on this topic to explore the technical feasibility, costs, and benefits of enhanced incentives that would motivate greater participation in secondary markets.

V. "Use or Share" Would Be a Particularly Effective Response if Lower Transaction Costs and Enhanced Incentives Do Not Stimulate Secondary Markets.

Should enhancing the efficiency of secondary transactions and increasing incentives for such transactions fail to spur spectrum holders to make their unused frequencies available for productive operations, the Commission should take stronger action. The reasons for holding back excess spectrum resources, even after these changes have been implemented by the Commission, could range from mere inertia to a desire to suppress new competitors or innovations.[50] Regardless of the root cause, however, maximizing the availability of spectrum resources in light of ever-increasing

[50] *See OECD Paper* at 39 (noting inertia and anti-competitive hoarding as potential sources of spectrum trading concerns).

demand, including by ensuring a sufficient supply of frequencies on the secondary market, should remain the Commission's primary objective.

In this scenario, implementing a "use it or share it" rule would stimulate spectrum supply and prevent waste. Until such time as a licensee itself uses the spectrum, the Commission could require a licensee to make its fallow frequencies available on a secondary basis. Dynamic spectrum databases could be used to automate the process, enabling time- or geography-limited opportunistic use of spectrum pursuant to Commission rules. To implement this more efficient regime, licensees would be required to provide usage information for their authorized spectrum to databases, subject to appropriate confidentiality protections. When a potential user seeks spectrum, availability could be determined quickly and easily through those databases in a manner that protects the licensees' commercially sensitive information.

"Use it or share it" could yield particularly meaningful results in rural and other underserved areas where there are "frequency blocks that the current licensees are not using productively – and that they may never build out, for economic reasons."[51] In addition to promoting the use of currently underutilized spectrum, moreover, "use it or share it" would provide the Commission with more reliable data about the aggregate volume of unused spectrum, particularly if "frequencies are available for opportunistic use up until such time as a licensee or lessee actually builds out and commences

[51] Michael A. Calabrese, *Use it or Share it: Unlocking the Vast Wasteland of Fallow Spectrum*, Working Paper, 39th Research Conference on Communication, Information and Internet Policy, at 28 (Sept. 25, 2011), *available at* http://ssrn.com/abstract=1992421.

operations – and not merely until such time as a licensee expresses an intention to enter into a lease."[52]

"Use it or share it" is superior in this respect to the "use it or lose it" model. The threat of ceding spectrum does not "by itself enable use of fallow spectrum in the communities that are among the last to be served – even assuming that the licensee will ultimately comply."[53] If a licensee does not see an economic reason to build out to a portion of its license area, due to factors like high costs or the perception of low demand, then the threat of losing that portion of its spectrum portfolio would have little impact on that licensee's behavior. Instead, opting for "use it or share it" could lead to both employment of otherwise unused frequencies and potential new business opportunities for market stakeholders. For instance, rural licensees under a mandate to "use it or share it" may become motivated to identify potential partners for new business ventures. The Commission also could build incentives or procedures into its "use it or share it" model that would enable secondary market spectrum users to take over frequencies permanently. For instance, the Commission could create a "first-in" preference for spectrum lessors to obtain authorizations to use frequencies ceded by licensees, whether voluntarily or due to lack of buildout.

VI. CONCLUSION

Despite persistent Commission efforts, secondary markets have not lived up to their promise in making unused spectrum held by large mobile operators available to

[52] *Id*.
[53] *Id*.

users with geographically limited or novel business models. Today's database systems and tools for near real-time spectrum management could change the equation by reducing transaction costs. Furthermore, the Commission can spark greater participation in secondary markets by reforming current policies, for instance by permitting reaggregation of previously disaggregated spectrum. If reduced transaction costs and enhanced incentives fail to effectively spur secondary market performance, the Commission should move ahead with "use it or share it" requirements that better align the obligations of spectrum holders with consumer interests.

Respectfully submitted,

Megan Anne Stull
Counsel

Andrew W. Clegg, PhD
Spectrum Engineering Lead

Google LLC
25 Massachusetts Avenue NW, 9th Floor
Washington, DC 20001

June 3, 2019